

Date: Thursday, 11/16/2006 4:21:31 PM
 User: Jim Johnston

Process Sheet

Customer : CU-DAR001 Dart Helicopters Services Drawing Name : SKID TUBE ASSEMBLY
 Job Number : 29465
 Estimate Number : 10023
 P.O. Number : N/A Part Number : D205634041
 This Issue : 11/16/2006 S.O. No. : N/A Drawing Number : D2580 REV C
 Prsht Rev. : NC Project Number : N/A
 First Issue : N/A Type : LANDING GEAR Drawing Revision : C
 Previous Run : 29464A Material : N/A
 Due Date : 12/10/2006 Qty: 1 Um: Each
 Written By :
 Checked & Approved By : 06/11/27
 Comment : Est Rev: N 02.08.28 FP was QC5 in Step 27; Added QC5 to Step 30 KJ
 Est Rev. O 06.02.28 Added paperwork EC

Additional Product

Job Number:



Seq. #: Machine Or Operation: Description :

1.0 DC DOCUMENT CONTROL



Comment: DOCUMENT CONTROL

Photocopy D205-634 bluefile & type labels per PPP D205-634 CHG001

KJ 06.11.28 (1)

2.0 D25001190 Ext'n -I' Beam Tube 4"



Comment: Qty.: 1.0400 Each(s)/Unit Total : 1.0400 Each(s)

Pick:

Qty Part Number

Description

Batch

1 D2500-1-190

Skid Tube Extrusion

B25858 m-h 06/11/27 (1)

3.0 D2596 205 Web



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty Part Number

Description

Batch

1 D2596

205 Web

B29604 m-h 06/11/28 (1)

4.0 LANDING GEAR 1 LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1- Inspect mat'l D2500-1-190 for damage

pmj 06/11/28

2-Cut D2500-1-190 per Dwg D2580 if necessary Deburr ends

pmj 06/11/28

3-Drill pilot holes using drill jig DT 8149

pmj 06/11/28

4-Acid etch and Alodine tube per QSI 005 4.1

m-h 06/11/27 (1)

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE		By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Thursday, 11/16/2006 4:21:32 PM
User: Kim Johnston

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: SKID TUBE ASSEMBLY

Job Number: 29465

Part Number: D205634041

Job Number:



Seq. #:

Machine Or Operation:

Description:

5-Open holes to 0.500" as per Dwg D2580 without cutting fluid

6-Countersink holes as per Dwg D2580 without cutting fluid

7-Deburr and blow out all chips from inside of tube

8-Bond web in place per QSI 015. Allow 12 Hrs. cure time before cutting

Pick:

Qty	Part Number	Description	Batch
A/R	Sikaflex-291	M18660	

Sikaflex expire date: 07-02-01

Start Time: 1:25 PM Date: 06/11/28

Fin Time: 1:32 PM Date: 06-11-29

m-h 06/11/28 ①

5.0

BENDING

BENDING MACHINE



Comment: BENDING MACHINE

1-Bend as per program D2580.C on CNC Bender and Folio FT009

2-Cut tubes as per Dwg. D2580

DP 6-11-29

6.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Deburr ends after cutting. Remove alodine from around holes

DP 6-11-30
AT 06-11-30

7.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

MS 06/11/30 ①

8.0

D25763

Step (Machining Detail)



Comment: Qty: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

Pick:

Qty	Part Number	Description	Batch
1	D2576-3	Step	B23060

BE 06/11/30

W/O:		WORK ORDER CHANGES						
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Process Sheet

CU-DAR001 Dart Helicopters Services

Drawing Name: SKID TUBE ASSEMBLY

ber: 29465

Part Number: D205634041

er:



Seq. #:

Machine Or Operation:

Description:

9.0

D2579

Crossbolt Spacer



Comment: Qty.: 20.0000 Each(s)/Unit Total: 20.0000 Each(s)

Pick:

Qty	Part Number	Description	Batch
20	D2579	Spacers	D29489 BE 06-11-30

10.0

LARGE FAB 1

LARGE FABRICATION RESOURCE 1



Comment: LARGE FABRICATION RESOURCE 1

1-Prepare tube for welding D2576-3 Step Remove alodine as required. BE 06-11-30

2-Weld step D2576 as per Dwg. D2580 and QSI 004

A/R Aluminum Rod M101655 BE 06-11-30

3-Weld crossbolt spacers D2579 as per Dwg. D2580 and QSI 004. For D2579 spacers, weld one side, pass 3/8" drill, weld other side, pass 3/8" drill

A/R Aluminum Rod M101655 BE 06-11-30

4-Grind welds as per Dwg D2580 Grind flush ridge made from bending PM'06-12-40

5-Drill holes for wearplates using DT 8217 Open holes to 19/64", adjust stopper not to hit web. Deburr PM'06-12-40

6-Counterbore crossbolt spacers to 7/16" ID x 1.0" deep as per Dwg D2580. Deburr holes PM'06-12-40

7-Drill pilot holes for aft cap using DT 8215 Open holes to #6 Drill bit. Deburr PM'06-12-40

8-Drill pilot holes for Tow ring using DT8091, open to .640" and Deburr PM'06-12-40

11.0

QC9

VISUAL WELDING INSPECTION



Comment: VISUAL WELDING INSPECTION

12.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

W/O:		WORK ORDER CHANGES						
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Drawing Name: SKID TUBE ASSEMBLY

Job Number: 29465

Part Number: D205634041

Job Number:



Seq. #:

Machine Or Operation:

Description :

13.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



M102391



Comment: HAND FINISHING RESOURCE #1

Powder Coat White (Ref: 4.3.5.2) as per QSI 005 4.3

Ylam 06/12/06 X 1

14.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

FL 06 12 07 ①

15.0

D25771

Wearplate Fwd



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty	Part Number	Description	Batch
1	D2577-1	Wearplate	28063

16.0

D25773

Wearplate Aft



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty	Part Number	Description	Batch
1	D2577-3	Wearplate	28013

17.0

D25775

Wearplate, Centre



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty	Part Number	Description	Batch
1	D2577-5	Wearplate	28122

18.0

ALS71032130

Insert



Comment: Qty.: 44.0000 Each(s)/Unit Total : 44.0000 Each(s)

Pick:

Qty	Part Number	Description	Batch
44	ALS7-1032-130	Inserts	18964

am 06/12/07 ①

W/O:		WORK ORDER CHANGES							
DATE	STEP	PROCEDURE CHANGE		By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Drawing Name: SKID TUBE ASSEMBLY

Job Number: 29465

Part Number: D205634041

Job Number:



Seq. #:

Machine Or Operation:

Description :

19.0

AN960JD10L

Washer



Comment: Qty.: 44.0000 Each(s)/Unit Total : 44.0000 Each(s)

Pick:

Qty	Part Number	Description	Batch
44	AN960JD10L	Washer	102217

20.0

AN34A

Bolt



Comment: Qty.: 44.0000 Each(s)/Unit Total : 44.0000 Each(s)

Pick:

Qty	Part Number	Description	Batch
44	AN3-4A	Bolt	102832

21.0

D25941

Plug



Comment: Qty.: 16.0000 Each(s)/Unit Total : 16.0000 Each(s)

plug

Batch: 29621

22.0

D25943

O-Ring



Comment: Qty.: 16.0000 Each(s)/Unit Total : 16.0000 Each(s)

o-ring

Batch: 27168

23.0

D2855

Cap



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Cap

Batch: 26351

24.0

AN35A

Bolt



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Bolt

Batch: 15205

a.m

06/12/07

①

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE		By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: D Date: 8/12/15
 QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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Drawing Name: SKID TUBE ASSEMBLY

Job Number: 29465

Part Number: D205634041

Job Number:



Seq. #:

Machine Or Operation:

Description :

25.0

AN960JD10L

Washer



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Washer

Batch: 102217

a.m 06/12/07

(1)

26.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

1-Install inserts & wearplates as per Dwg. D2580. Use a drop of Sikaflex on insert holes before installing wearplates

A/R

Sikaflex-291

102107

Sikaflex expire date: 02 07

2-Coat D2594-3 O' rings with Petroleum Jelly and install on D2594-1 plugs as per Dwg D2580

3-Inspect for foreign object per QSI 024

4-Install 2855 Aft Cap as per Dwg D2580 and seal Fwd Step & Aft Cap with Sikaflex. Clean excess adhesive

A/R

Sikaflex-291

102107

Sikaflex expire date: 02 07

5-Wing Walk as per Dwg D2580 and QSI 005 4.4

M102635

Batch:

M/V a.m

06/12/13 (1)

27.0

QC5

INSPECT WORK TO CURRENT STEP



06/12/14



Comment: Inspect Aft Cap, Fwd Step and Wing Walk of work to Current Step Inspect for Foreign objects per QSI 024

28.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and pack for shipping as per PPP D205-634-041

Location:

PPP Rev:

12

06/12/14

29.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

06/12/15 (1)

06/12/15

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE		By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries



DESIGN <i>[Signature]</i>	DRAWN BY <i>[Signature]</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>[Signature]</i>	APPROVED <i>[Signature]</i>	DRAWING NO. D2580	REV. C SHEET 1 OF 2
DATE 98.08.26		TITLE 205 SKIDTUBE ASSEMBLY SCALE NTS	
A	96.09.16	NEW ISSUE	
B	96.12.02	AS MANUFACTURED	
C	98.08.26	REDRAWN, INCLUDED DEO 9094/9097	

RELEASED
98/09/17 DS

QTY	Part Number	Description
X	D2580-041	SKIDTUBE ASSEMBLY
*	D2500-1	EXTRUSION
1	D2596	205 WEB
1	D2575	AFT CAP
1	D2576 - 3	STEP
20	D2579	CROSS BOLT SPACER
16	D2594-1	PLUG
16	D2594-3	O-RING
1	D2577-1	WEARSHOE
1	D2577-3	WEARSHOE
1	D2577-5	WEARSHOE
44	ALS7-1032-130 or AKS7-1032-130 or AKS4-1032-130 or ALS4-1032-130	INSERT
46	AN3-4A	BOLT
46	AN960JD10L	WASHER

00.08.28
CP 00.08.23

EFFECTIVE DEOS
98/12/14
DEO 9124
DEO 9183

GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 2) LENGTH OF D2500-1 EXTRUSION BEFORE BENDING = 190 INCHES *
- 3) INSERT D2596 WEB TO LOCATION SHOWN OFF AFT END OF SKIDTUBE AND BOND WEB INTO OUTER TUBE WITH NON-STRUCTURAL SIKAFLEX-241 ADHESIVE PER DART QSI 015 BEFORE BENDING. ENSURE HOLES LINE-UP.
- 4) BEND AS A SMOOTH RADIUS STARTING WITH A MAXIMUM CENTERLINE RADIUS OF 60 AND ENDING WITH A MINIMUM RADIUS OF 30. A MAXIMUM REDUCTION OF 0.200 IN DIAMETER IS ALLOWABLE IN THE BENT PORTION OF THE TUBE.
- 5) USE DART DRILL TEMPLATE TD2577-205 TO LOCATE AND DRILL Ø0.297 HOLES FOR WEARSHOE INSERTS. INSTALL ALS7-1032-130 PER SECTION D-D (44 PLACES) AFTER FINISH. INSTALL AN3-4A BOLTS AND AN960JD10L WASHERS WITH SIKAFLEX-241.
- 6) WELDING TO BE DONE PER DART QSI 004.
- 7) FINISH:
ACID ETCH, ALODINE PER DART QSI 005 4.1 PRIOR TO INSERTING D2596 WEB
POWDER COAT ASSEMBLY GLOSS WHITE (REF 4.3.5.1) PER DART QSI 005 4.3
BLACK ANTI-SKID PAINT AS INDICATED PER DART QSI 005 4.4
- 8) INSERT D2594-1 PLUG C/W D2594-3 O-RING IN HOLES MARKED 'P' (BOTH SIDES OF TUBE) AFTER FINISH (16 PLACES).

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
EFFECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 29465

Diagram of a circular cross-section of a pipe with four vertical stiffeners. The stiffeners are spaced 3.500 units apart. The distance from the centerline to the outer edge of the stiffeners is 1.750 units.

Diagram of the underside of a D2576 propeller. The diagram shows a cross-section of the propeller with several grinding locations marked. Labels include: GRIND FLUSH (4 PLACES), GRIND FLUSH, GRIND FLUSH, LOCATION RIDGE ON UNDERSIDE OF D2576, and a 1/4 inch dimension line.

Diagram illustrating the assembly of a bolted joint. The components and instructions are labeled as follows:

- DRILL PRIOR TO D2575 CAP INSTALLATION (2 PLACES)
- #0.208
- SEAL WITH SIKAFLEX-241
- AN3-4A BOLT (1)
- AN96JDI10L WASHER (1)
- (2 PLACES)
- D2575 CAP

D2579 SPACER

WEB (REF)

-130 (REF)

4 PLACES

AFTER PERFO

1. CHA

2. INS

3. WEI

4. C'B

D2580-1 DRILLING DETAIL

37.50
DISTANCE TO AFT END
OF D2592 WEB

3
7

1.750 1.750

40.508 (TYP.)
(40 PLACES)

REFER TO DETAIL A

8.750 17.375 26.000 34.188

57.313 (REF)
7 EQUAL SPACES
8.188 PITCH

38.0 91.500

190.0
(D2500-1)

REFER TO DETAIL A

Figure 1 is a plan view of a horizontal curve. It shows a horizontal alignment with a curve. Key dimensions include: a 1.4m offset from the start of the curve to the centerline; a 13.4m distance between the hole and the tangent point; a 1.0m distance between the hole and the tangent point; a 32.0m distance between the hole and the tangent point; a 20.0m offset from the end of the curve to the centerline; and a 11.0m offset from the end of the curve to the centerline. A 4m offset is also indicated at the end of the curve.

0.5

1.5

1.5

D

P P P P P P P P

REFER TO DETAIL C

D2577-3

8

D2577-5

D2577-1

BLACK ANTI-SKID TOP OF STEP
TO 0.5 ABOVE BOTTOM EDGE

WELD AS PER DETAIL B

BLACK ANTI-SKID TO 0.5
ABOVE LOCATION RIDGE

1.5

1.5

1.5

AN3-4A BOLT (1)
AN960JD10L WASHER (1)
(44 PLACES)

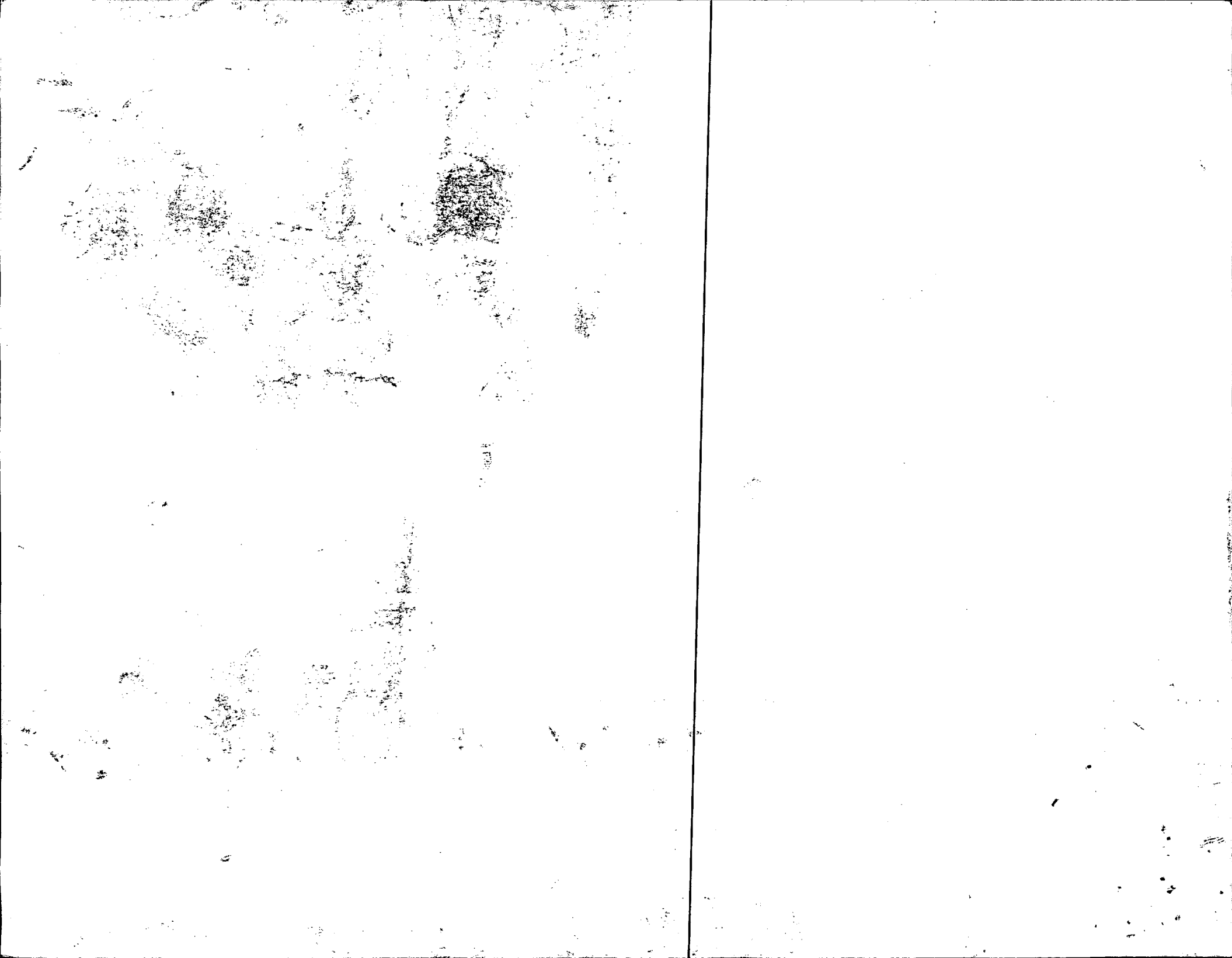
DESIGN *[Signature]*

DRAWN BY *[Signature]*

DART

RELEASED
98/09/17 DS

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NO. 80

AWS D17.1.2001
QUALIFICATION TEST RECORD

Name Barclay Elliott
Joint Welding Procedure Tig
Part number and Job number A205 634 041 / B 29469 A

TEST WELDS REQUIRED

BASE METAL Alum WELDING PROCESS Tig
Penetration Complete ☐ Partial ☒ Single Weld ☒ Double Weld ☐
Current AC ☒ DC ☐ Backing YES ☐ NO ☒

	Position	Vertical	Down <input type="checkbox"/>	Up <input type="checkbox"/>
Sheet Groove	1G <input type="checkbox"/>	2G <input type="checkbox"/>	3G <input type="checkbox"/>	4G <input type="checkbox"/>
Tube Groove	1G <input type="checkbox"/>	2G <input type="checkbox"/>	5G <input type="checkbox"/>	6G <input type="checkbox"/>
Sheet Fillet	1F <input type="checkbox"/>	2F <input type="checkbox"/>	3F <input type="checkbox"/>	4F <input type="checkbox"/>
Tube Fillet	1F <input type="checkbox"/>	2F <input type="checkbox"/>	4F <input type="checkbox"/>	5F <input type="checkbox"/>

Crossbolt Spacer Welded into Skidtube

TEST RESULTS

Visual Pass ☒ Fail ☐
Penetration Pass ☒ Fail ☐
Crossbolt Spacer Pass ☒ Fail ☐

The above named individual is qualified in accordance with AWS D17.1.2001 to weld

Date of Test Coupon 06/11/29 Qualifier David Wood